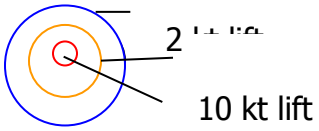
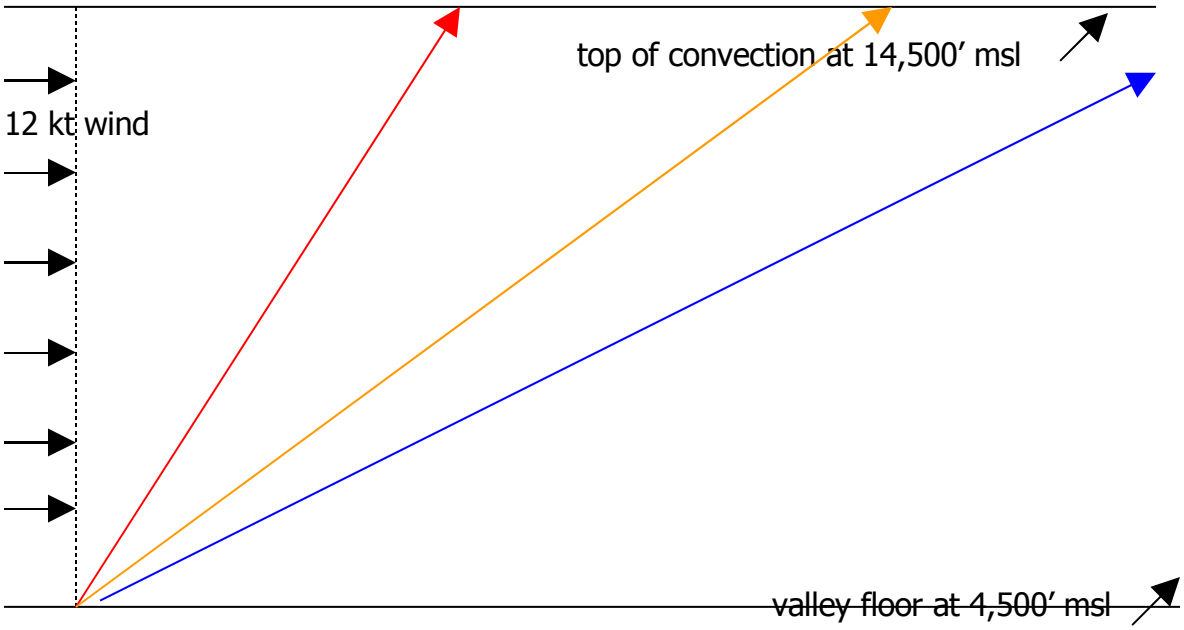
How does wind distort a thermal?

We usually conceive of a thermal as having a domed vertical velocity profile, so that the strongest lift is at the core and as we move outward from the center we find progressively weaker lift:



Most glider pilots implicitly assume that this cross-section won't change, except perhaps to expand, with increasing altitude—that this circular velocity distribution simply drifts downwind while keeping its shape. But does it?



In this example, the 10-knot lift (in red) at the core of this thermal will take 10 minutes to climb from the surface to 14,500' (a gain of 10,000 ft); as it does it will drift downwind at 12 knots, thus drifting 2 nm downwind. However, the air rising at 5 kts (in orange) will take twice as long to make the climb—and thus drift twice as far. The 2-kt lift will take even longer! It is easy to see that after a long climb in a steady wind, a thermal will be distorted into a long plume oriented parallel with the wind in the convective layer: